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Effectiveness of auricular acupressure and breathing exercises for smoking cessation

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ABSTRACT

Objective: To determine the effectiveness of auricular acupressure and breathing exercises in smoking cessation treatment and monitor their adverse drug reaction (ADR). *Methods:* We prospectively analyzed 60 patients in National Hospital of Traditional Medicine who were addicted to smoking between June 2020 and September 2020. This is a case-control study. Patients were enrolled into two groups: a case group, which was treated with auricular acupressure and breathing exercises (n=30); a control group which was only treated with auricular acupressure (n=30). The results between 2 groups after 28 days of treatment are compared based on many criterias which includes Symptoms of withdrawal syndrome, Mood and Physical Symptoms Scale (MPSS) and breathe carbon monoxide concentrations. *Results*: After 28 days of treatment, in the study group 63.3% of the cases were very good, 10% were good, 26.7% were ineffective; in the control group 46.7% of the cases were very good, 20% were good, 33.3 % were ineffective. *Conclusion*: Auricular acupressure combined with breathing exercises is better in improving symptoms of withdrawal syndrome (shortness, irritability, insomnia, cravings) and decreasing levels of CO in patients' breath after smoking cessation than cases using auricular acupressure only.

Keywords: Smoking cessation, withdrawal syndrome, auricular acupressure, breathing exercises.

1. INTRODUCTION

Tobacco is one of the biggest public health threats the world have faced. Tobacco kills more than 8 million people each year. More than 7 million of those deaths are the result of direct tobacco use while around 1.2 million are the results of non-smokers being exposed to second-hand smoke (St Claire et al., 2020). In Vietnam, according to the Global Adult Tobacco Survey in 2015, 22.5% of the population over 15 years old are smoking cigarettes, which are the equivalent of 15.6 million people. There are more than 7,000 chemicals in tobacco smoke, in which at least 250 are known to be harmful, including

hydrogen cyanide, carbon monoxide, and ammonia. Among the 250 known harmful chemicals in tobacco smoke, at least 69 can cause cancer (Xue et al., 2014) and especially Nicotine which is the drug primarily responsible for a person's addiction to tobacco products including cigarettes. Tobacco also causes other serious chronic illnesses such as: stroke, heart attack, chronic obstructive pulmonary disease or cancer.

Smoking is very harmful, and smoking cessation is very necessary, but in the process of smoking cessation, patients often face with withdrawal symptoms such as: cravings, anxiety, irritable, itchy throat, weight gain, etc. these symtoms really made them uncomfortable and affect the smoking cessation process. Since then, we have implemented a topic aimed: Determining effectiveness of auricular acupressure and breathing exercises for smoking cessation.

2. MATERIALS AND METHODS

Participants

Patients aged between 18 and 80, regardless of gender or occupation, were diagnosed with tobacco addiction according to DSM – IV (Diagnostic and Statistical Manual of Mental Disorders 4th) and gain total points ≥ 7 when answering Smoking cessation motivation questionnaire (Q-MAT) (Aubin et al., 2004). Participants are excluded from the study if they have acute infectious diseases, tuberculosis, cancer, hepatitis, serious diseases such as heart failure, liver failure, kidney failure, high blood pressure, HIV end stage or injury in the ear area; Pregnant; Patients taking other treatments; Patients not following the research protocol; Patients who are allergic to the tape for the seeds. The study was conducted at National Hospital of Traditional Medicine between June 2020 and September 2020. Informed consent of the patients were obtained.

Settings

- First day of visit: Smokers are given preliminary examination and questionnaire. Select eligible subject's to participate in the research.
- Conduct smoking cessation counseling for smokers. Counseling time is about 15-30 minutes and phone numbers are provided for more supports.
- Measure heart rate, blood pressure, breath CO concentrations. Take blood samples for hematology test, biochemistry test (AST, ALT, Ure, Creatinin ...) and urine test.
- Explain about the treatment method, instruct patients in the study group to relax themselves for 5 minutes before and after breathing exercises.

Study design

Case-control randomized clinical trial: The subjects were randomly divided into 2 groups similar in age, gender and level of addiction (pull lottery to divide into groups)

Group 1 (study group, 30 patients): treated with auricular acupressure combined with breathing exercises.

Group 2 (control group, 30 patients): only treated with auricular acupressure.

We monitor, evaluate and compare the treatment results in these two groups after 28 days of treatment, from which we can see the effectiveness of auricular acupressure and breathing exercises in smoking cessation. When the course is over, we still continue to observe the patients for 1 more month to evaluate the effectiveness of the intervention method.

Auricular acupressure Treatment Protocol

Auricular Points

1. Ear shenmen 2. Kidney 3. Lung	4. Heart 5. Spleen 6. Mouth	7. Subcortex 8. Sympathesis

Technique

Vaccaria seeds (natural, nontoxic, botanical seeds), approximately 1.6 mm in diameter, were applied to the ears. Participants were told to press the seeds on each ear for 5-10 seconds whenever they crave smoking, want to smoke or have other discomfort symptoms while quitting smoking. The seeds will be removed after 7 days.

Breathing exercises

Patient self-exercises breathing every day for 15 minutes for 28 days at home, following these instructions:

- *Posture*: Lie on your back, without pillow under the head, raise your buttocks 10 - 20 cm high by using a pillow, legs stretched, one hand on chest, one hand on stomach.

- *Steps:*

+ Step 1: Inhale evenly, deeply, maximally, enlarge chest and abdomen. Time equals ¼ cycle of breathing, which corresponds to the sentence "Breathe in untill chest enlarged, belly tense".

+ Step 2: Hold breath, diaphragm and chest are all constricted at maximum, larynx is open; take turns of raising each leg 20cm high. Time equals ¼ cycle of breathing, corresponds to the sentence: "Keep your breath, try to breathe more".

+ Step 3: Exhale comfortably, naturally without restraint and pushing. Time equals ¼ cycle of breathing, which corresponds to the sentence: "Breathe without restraint".

+ Step 4: Stop exhaling, complete relaxation, feel heavy and warm, implied: your limbs are heavy and warm, your whole body is heavy and warm, the time equals ¼ cycle of breathing, which corresponds to the sentence: "Think that your body is heavy and warm".

Evaluation criteria

Symptoms of withdrawal syndrome: Mood and Physical Symptoms Scale (MPSS) (West R, 2005) and breath carbon monoxide concentrations before and after treatment (D0 and D28). For data processing we use SPSS 20.0 software. Comparing the mean values at each time (before and after treatment) and between two independent groups (study and control) (Figure 1).

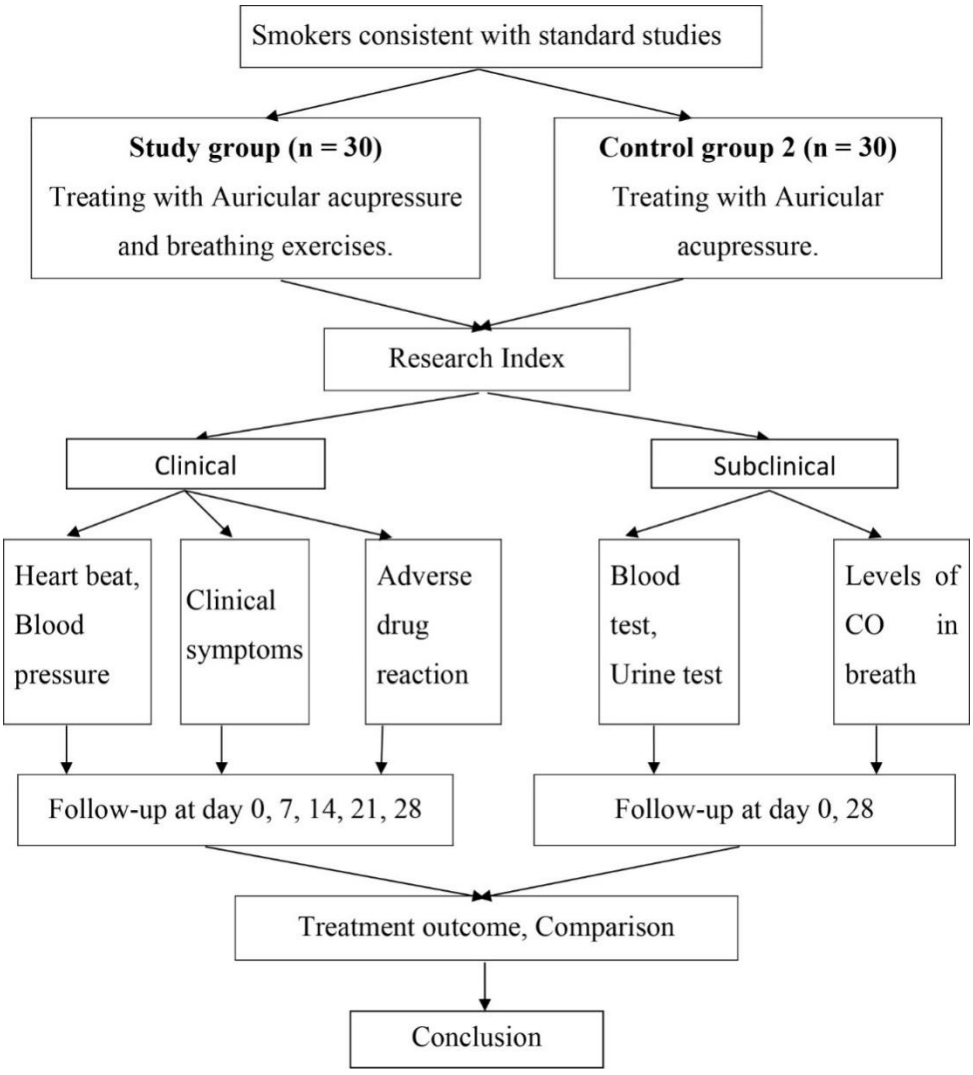

Figure 1 Flow chart of patients

3. RESULT

A total 60 patients were prospectively study. Table 1 presents the improvement of withdrawal symptoms. Withdrawal symptoms were appear mostly on the 1st day to the 7th day after quiting smoking. The most common withdrawal symptoms are: tobacco craving, stress, poor concentration, anxiety, irritability, poor sleep at night and weight gain. The method significantly reduced withdrawal symptoms, which started to decrease from day 14 and decrease sharply on day 21. Comparing the 2 groups, we found that the study group has significantly lower prevalence of withdrawal syndrome than the control group. The results based on the MPSS scale was showed in Table 2 and Figure 2. Most patients in study group had more very good or good results as comprared with control group.

Table 1 Improvement of withdrawal symptoms

Symptoms	Study group (n=30)					Control group (n=30)				
	D0	D7	D14	D21	D28	D0	D7	D14	D21	D28
Craving in smoking	25	29	13	10	8	24	30	18	13	10
Anxiety	6	2	0	0	0	8	7	2	1	0
Stress	11	13	3	0	0	10	7	5	2	1
Irritable	5	2	0	0	0	5	3	1	0	0
Poor concentration	9	12	3	2	2	8	11	6	5	2
Poor sleep at night	4	2	0	0	0	2	3	3	1	1
Headache	1	0	0	0	0	0	0	0	0	0
Cough	2	3	0	0	0	3	2	0	0	0
Itchy throat	2	1	0	0	0	3	1	0	0	0
Gain weight	0	4	4	3	2	0	5	6	3	2
Other	0	0	0	0	0	0	0	0	0	0
∑	65	68	23	15	12	63	69	35	25	16
p(D0-D28)	< 0.05									

Table 2 Results based on the MPSS scale

Results	Study group (n=30)		Control group (n=30)	
	n	%	n	%
Very Good	17	56.7	9	30
Good	6	20	10	33.3
Average	5	16.7	3	10
Poor	2	6.7	8	26.7
∑	30	100	30	100
p N1-N1	0.037			

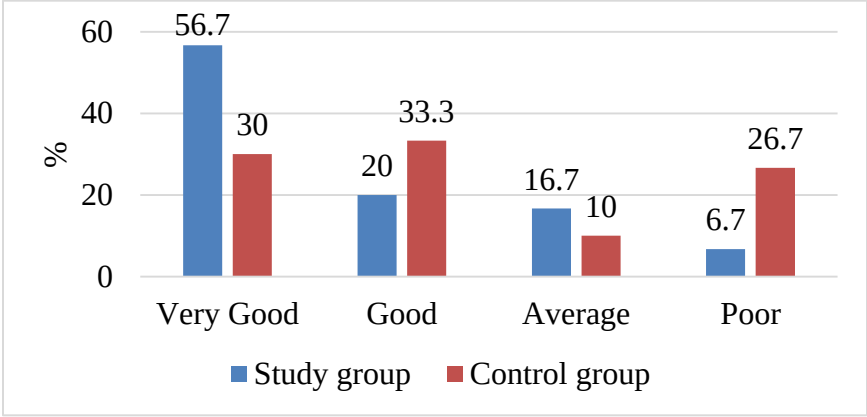

Figure 2 Treatment results based on the MPSS scale

Breath CO concentration before and after treatment were compared in Table 3. Evaluate treatment results based on CO concentration were showed in Table 4 and Figure 3. The results of treatment on the MPSS scale in the study group and the control group, in which the research group with very good results had a higher rate with 56.7% compared to the control group of 30%, the poor performance of the study group was also at a lower rate with 6% compared to the control group of 26.7%. This difference was statistically significant with p N1-N2 = 0.037 <0.05. The change of heart beat and blood pressure was presented in Table 5. They all demontrated that most patients had good outcomess after treatment.

Table 3 Breath CO concentration before and after treatment

Day		CO concentration (ppm)		p N1-N2
		Study group (n=30)	Control group (n=30)	
D0		16±2.12	15.27±2.3	0.204
D7		13.17±2.89	13.23±2.33	0.922
D14		9.7±2.53	11.53±3.4	0.022
D21		7.97±3.67	10.27±3.8	0.021
D28		5.77±4.51	8.47±5.32	0.038
p	Before After	0.00	0.00	

Table 4 Evaluate treatment results based on CO concentration

Results	Study group (n=30)		Control group (n=30)	
	n	%	n	%
Very good	19	63.3	14	46.7
Good	3	10	6	20
Ineffective	8	26.7	10	33.3
∑	30	100	30	100
p(CO)	0.038			

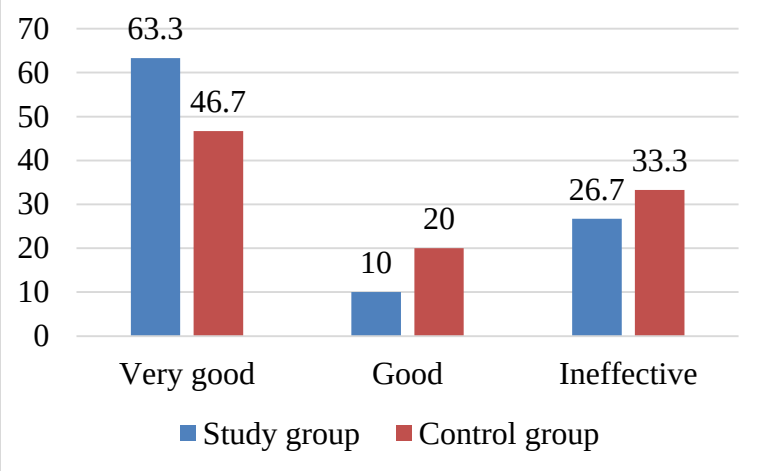

Figure 3 Treatment results based on CO concentration

Laboratory was investigated such as urine test before and after treatment (Table 6), Hematology test before and after treatment (Table 7), Biochemistry test before and after treatment (Table 8) to confirm the outcomes after treatment.

Table 5 The change of heart beat and blood pressure

Index	Study group (n=30)			Control group(n=30)		
	Before treatment	After treatment	p	Before treatment	After treatment	p
Heart beat	72.33±9.27	72.73±8.63	0.22	73.9±5.8	74.1±5.18	0.57
Systolic blood pressure	121.33±6.81	119.83±7.25	0.12	126.67±10	127±9.15	0.66
Diastolic blood pressure	73.5±4.76	73.5±9.75	1	80.33±7.64	80.17±7.13	0.75

Table 6 The urine test before and after treatment

Index	Study group (n=30)			Control group (n=30)		
	Before treatment	After treatment	p	Before treatment	After treatment	p
SG	1.017±0.008	1.018±0.007	0.35	1.009±0.004	1.008±0.004	0.72
PH	6.32±0.65	6.27±0.54	0.75	7.33±0.9	7.13±0.8	0.36

Table 7 Hematology test before and after treatment

Index	Study group (n=30)			Control group (n=30)		
	Before treatment	After treatment	p	Before treatment	After treatment	p
RBC	4.84±0.42	4.79±0.45	0.37	4.67±0.26	4.7±0.26	0.29
WBC	7.85±2.16	7.67±0.89	0.63	7.01±0.41	6.97±0.58	0.71
PLT	232±42.1	234.17±45	0.74	312.37±12.4	312.07±21.67	0.93

Table 8 Biochemistry test before and after treatment

Index	Study group (n=30)			Control group (n=30)		
	Before treatment	After treatment	p	Before treatment	After treatment	p
Ure	5.99±1.43	6.03±0.89	0.78	4.49±0.21	4.49±0.19	0.92
Creatinin	97.27±16.11	94.97±11.9	0.23	71.63±3.58	72.37±3.59	0.18
Glucose	5.62±1.18	5.54±0.7	0.53	4.91±0.17	4.9±0.18	0.79
GOT	29.83±7.9	28.8±7.18	0.26	23.57±3.27	24.83±3	0.06
GPT	42.6±8.4	41/37±7.37	0.23	29.87±4.19	31.2±3.65	0.14
Cholesterol	5.2±0.58	5.18±0.52	0.77	4.86±0.082	4.88±0.73	0.25
Triglycerid	2.16±0.88	2.06±0.74	0.09	1.71±0.064	1.68±0.11	0.25
HDL	1.18±0.32	1.12±0.22	0.65	1.28±0.092	1.25±0.11	0.2
LDL	2.61±0.39	2.58±0.46	0.16	3.1±0.28	3.14±0.17	0.19

Table 9 shows that no adverse drug reaction was happened with the patients. After 1 month of finishing the treatment course, in the study group there were 73.3% cases did not smoke, 26.7% cases smoked again, in the control group with 66.7% cases had no longer smoked and 33.3% smoked again. Compared with the previous results, we found that the results after 1 month of finishing treatment did not change (Table 10).

Table 9 Adverse drug reaction

	Signs	Study group (n=30)		Control group (n=30)	
		n	%	n	%
1	Dizzy	0	0	0	0
2	rashes	0	0	0	0
3	Infection	0	0	0	0
4	Other	0	0	0	0
∑		0	0	0	0

Table 10 Results 1 month after the treatment

Group / Result	Study group (n=30)		Control group (n=30)	
	N	%	N	%
No more smoking	22	73.3	20	66.7
Smoking again	8	26.7	10	33.3

4. DISCUSSION

Cigarette smoking is the single most preventable cause of premature death in the United States. In 1985, approximately 390 000 deaths were attributable to cigarette smoking, and more than 434 000 deaths occurred in 1988. During 1990, 418 690 US deaths, roughly 20% of all deaths, were attributed to smoking (Bier et al., 2002). This study demonstrated that, withdrawal symptoms appear mostly on the 1st day to the 7th day after quiting smoking, the most common withdrawal symptoms are tobacco craving, stress, poor concentration, anxiety, irritability,poor sleep at night and weight gain (Table 1). The method significantly reduced withdrawal symptoms, which started to decrease from day 14 and decrease sharply on day 21. Comparing the 2 groups, we found that the study group has significantly lower prevalence of withdrawal syndrome than the control group. Table 4 shows that the results of treatment on the MPSS scale in the study group and the control group, in which the research group with very good results had a higher rate with 56.7% compared to the control group of 30%, The poor performance of the study group was alsoat a lower rate with 6% compared to the control group of 26.7%. This difference was statistically significant with p N1-N2 = 0.037 <0.05.

Our results were similar with the study of Bier et al., (2002) with 141 adults in a quasi-factorial design using acupuncture, sham acupuncture, and education. All groups showed significant reductions in smoking and posttreatment cigarette consumption, with the combined acupuncture–education group showing the greatest effect from treatment. The trend continued in follow-up; however, significant differences were not maintained. Greater pack-year history (i.e. the number of years smoking multiplied by baseline number of cigarettes smoked per year, divided by 20 cigarettes per pack) negatively correlated with treatment effect. Trend analysis suggested 20 pack-years as the cutoff point for this correlation.

The CO concentration in the patient's breath decreased significantly after 7 days and after treatment in both groups. In the study group, CO concentration after 7 days of treatment decreased from 16 ± 2.12 to 13.17 ± 2.89 and after 28 days this index was only 5.77 ± 4.51; in the control group, the CO concentration after 7 days decreased from 15.27 ± 2.3 to 13.23 ± 2.33 and after 28 days this index was only 8.47 ± 5.32. This result was statistically significant with p after 7 days and p before and after treatment are <0.05.The results of treatment based on CO concentration showed that the study group had a higher rate of very good results than the control group and the rate of ineffective results is lower than the control group's. Specifically, the very good rate of the study group was 63.3%, no result was 26.7% and the control group had a very good rate of 46.7%, no result was 33.3%. The results of the change in CO concentration differed between the two groups P N1-N2 = 0.038 <0.05.

After 1 month of finishing the treatment course, in the study group there were 73.3% cases did not smoke, 26.7% cases smoked again, in the control group with 66.7% cases had no longer smoked and 33.3% smoked again. Compared with the previous results, we found that the results after 1 month of finishing treatment did not change. There were no statistically significant changes before and after treatment for heart rate and blood pressure, urine specific gravity, urine pH, red blood cells, white blood cells, platelets and blood biochemical (p> 0.05).

During our study, we did not report any adverse effects such as dizziness, rashes at the site of the atrial patch, infection or any other complications. This was similar to the results in the study of White et al., (2009). Further studies with more power are needed to determine whether the abstinence rate demonstrated at the end of treatment can be maintained throughout the 18-month follow-up period. Another limitation of the study was the use of subject self-reports to determine cigarette use, which could have biased the results if reporting was not accurate or truthful.

5. CONCLUSION

The method of auricular acupressure combined with breathing exercises brings better results than using only auricular acupressure. During the study, the auricular acupressure combined with breathing exercises did not have adverse effects on the clinical and some subclinical indicators.

Contribution of the authors

All authors have contributed equally to this work. All authors read and approved the final manuscript and agreed to publish this manuscript.

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Conflict of Interest

The authors declare that there is no conflicts of interests.

Ethical approval

The study was approved by the Medical Ethics Committee of National Hospital of Traditional Medicine (ethical approval code: 32/IBR-NHTM).

Data and materials availability

All data associated with this study are present in the paper.

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